Marine Biology

International Journal on Life in Oceans and Coastal Waters

Volume 88, 1985

Editor in Chief

O. Kinne Ecology Institute, Nordbünte 30, 2124 Oldendorf / Luhe, Federal Republic of Germany

Editors

M. Anraku
Nansei Regional Fisheries Research Laboratory, Ono-cho, Saeki-gun
Hiroshima-ken 739-04, Japan

B. Battaglia
Istituto di Biologia Animale
dell 'Universitá
Via Loredan 10, 35100 Padova, Italy

R. S. Carney
Moss Landing Marine Laboratories
P.O. Box 223
Moss Landing, California 95039, USA

R. W. Doyle
Department of Biology
Dalhousie University
Halifax, N.S. B3H 4J1, Canada

T. M. Fenchel
Laboratory of Ecology, Zoological Institute
University of Aarhus
8000 Aarhus C, Denmark

G. F. Humphrey
CSIRO Marine Biochemistry Unit
Botany Building, University of Sydney
Sydney, NSW 2006, Australia

O. Kinne
Ecology Institute
Nordbünte 30
2124 Oldendorf / Luhe
Federal Republic of Germany

J. M. Lawrence
Department of Biology
University of South Florida
Tampa, Florida 33620, USA

J. Mauchline
Scottish Marine Biological Association
Dunstaffnage Marine Research Laboratory
P.O. Box 3
Oban PA34 4AD, Argyll, Scotland

J. M. Pérès
Station Marine d'Endoume
et Centre d'Océanographie
Rue de la Batterie-des-Lions
Marseille (7e), France

P. C. Schroeder
Department of Zoology
Washington State University
Pullman, Washington 99164-4220, USA

J. M. Shick
University of Maine at Orono
Department of Zoology
Murray Hall
Orono, Maine 04469, USA

M. E. Vinogradov
P. P. Shirshov Institute of Oceanology
USSR Academy of Sciences
23 Krasikova
Moscow 117218, USSR

Assistants to the Editors

R. Friedrich, T. E. Galvin
Ecology Institute, Nordbünte 30, 2124 Oldendorf / Luhe,
Federal Republic of Germany

Springer International

The final decision on manuscript acceptance rests with the Editor in Chief. The date of final manuscript acceptance and the name of the communicating editor follow each printed contribution.

Scope of Marine Biology

The Editors invite and will consider for publication original contributions to the following fields of research:

Plankton research: Studies on the biology, physiology, biochemistry and genetics of plankton organisms both under laboratory and field conditions. Biological and biochemical oceanography. Environment-organism and organism-organism interrelationships.

Experimental biology: Research on metabolic rates and routes in microorganisms, plants and animals. Respiration; nutrition; life cycles.

Biochemistry, physiology and behaviour: Biochemical research on marine organisms; photosynthesis; permeability; osmoregulation; ionregulation; active transport; adaptation; analyses of environmental effects on functions (tolerances, rates and efficiencies of metabolism, growth and reproduction) and structures; migrations; orientation; general behaviour.

Biosystem research: Experimental biosystems and microcosms. Energy budgets: flow routes and balance sheets of energy and matter in the marine environment. Interspecific interrelationships, food webs. Dynamics and structures of microbial, plant and animal populations. Use, management and protection of living marine resources. Effects of man on marine life, including pollution.

Evolution: Investigations on speciation, population genetics, and biological history of the oceans.

Theoretical biology related to the marine environment: Concepts and models of quantification and mathematical formulation; system analysis; information theory.

Methods: Apparatus and techniques employed in marine biological research; underwater exploration and experimentation.

Copyright

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.
All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all transiation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.
The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.
While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Special regulations for photocopies in the USA: Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. This fee is US $ 0.20 per page, or a minimum of US $ 1.00 if an article contains fewer than five pages. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0025-3162, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

Other regulations: Authors publishing in this journal can, under certain conditions, benefit from library and photocopy fees collected by VG WORT. Authors resident in the Federal Republic of Germany or in West Berlin can apply to Verwertungsgesellschaft WORT, Abteilung Wissenschaft, Goethestraße 49, D-8000 München 2, for detailed information.

Subscription information

Volumes 85–89 (3 issues each) will appear in 1985.

North America: Annual subscription rate: Approx. US $ 626.00 (single issue price: approx. US $ 49.00) including carriage charges. Subscriptions are entered with prepayment only. Orders should be addressed to:
Springer-Verlag New York Inc.
Service Center Secaucus
44 Hartz Way
Secaucus, NJ 07094, USA
Tel. 201/348-4033, Telex 0023 125 994

All other countries: Annual subscription rate: DM 1640.00 plus carriage charges. Volume price: DM 328.00, single issue price: DM 131.20, plus carriage charges. Airmail delivery on request only. Carriage charges for SAL (Surface Airmail Lifted) to Japan, India, Australia and New Zealand are available on request. Orders can either be placed with your bookdealer or sent directly to:

Springer-Verlag
Heidelberger Platz 3
D-1000 Berlin 33
Tel. (0) 30/82 07-1, Telex 1-83 319

Changes of address: Allow six weeks for all changes to become effective. All communications should include both old and new addresses (with Postal Codes) and should be accompanied by a mailing label from a recent issue.

Back volumes: Prices are available on request.

Microform: Microform editions are available from:
University Microfilms International
300 N. Zeeb Road
Ann Arbor, MI 48106, USA

© Springer-Verlag Berlin Heidelberg 1985
Springer-Verlag GmbH & Co KG, D-1000 Berlin 33
Printed in Germany

Production
Springer-Verlag
Journal Production Department I
Postfach 105 280
D-6900 Heidelberg 1
Federal Republic of Germany
Tel. (0) 62 21/4 87-4 33, Telex 4-61 723

Responsible for presentation of text
Professor Dr. O. Kinne, Editor in Chief
Ecology Institute
Nordbünte 30
D-2124 Oldendorf/Luhe
Federal Republic of Germany

Responsible for advertisements
Springer-Verlag, E. Lückermann
Kurfürstendamm 237
D-1000 Berlin 15
Tel. (0) 30/8 82 10 31, Telex 1-85 411

Printers
Graphischer Betrieb Konrad Triltsch
D-8700 Würzburg

Contents

Volume 88 Number 1 1985

R. H. Reed, W. D. P. Stewart
Osmotic adjustment and organic solute accumulation in unicellular cyanobacteria from freshwater and marine habitats 1

J. E. Thompson, R. P. Walker, D. J. Faulkner
Screening and bioassays for biologically-active substances from forty marine sponge species from San Diego, California, USA 11

J. E. Thompson
Exudation of biologically-active metabolites in the sponge *Aplysina fistularis*. I. Biological evidence 23

R. P. Walker, J. E. Thompson, D. J. Faulkner
Exudation of biologically-active metabolites in the sponge *Aplysina fistularis*. II. Chemical evidence 27

R. D. Vetter
Elemental sulfur in the gills of three species of clams containing chemoautotrophic symbiotic bacteria: a possible inorganic energy storage compound 33

D. Cossa, J.-G. Rondeau
Seasonal, geographical and size-induced variability in mercury content of *Mytilus edulis* in an estuarine environment: a re-assessment of mercury pollution level in the Estuary and Gulf of St. Lawrence 43

D. M. Perry
Function of the shell spine in the predaceous rocky intertidal snail *Acanthina spirata* (Prosobranchia: Muricacea) 51

M. Hutcheson, D. C. Miller, A. Q. White
Respiratory and behavioral responses of the grass shrimp *Palaemonetes pugio* to cadmium and reduced dissolved oxygen 59

G. W. Brand
Effect of crowding on larval viability in *Tisbe holothuriae* (Copepoda: Harpacticoida) 67

H. Grigg, L. J. Holmes, S. J. Bardwell
Seasonal observations on the biometry and development in Copepodite Stage V of *Calanus finmarchicus* from the Firth of Clyde 73

D. Binet
Essai d'utilisation de la diversité spécifique dans l'analyse des communautés de copépodes planctoniques du lagon de Nouvelle-Calédonie. [Attempt to use specific diversity in the analysis of planktonic copepod communities in the New Caledonian lagoon] 85

T. Toyoshima, H. S. Ozaki, M. Shimada, T. Okaichi, T. H. Murakami
Ultrastructural alterations on chloride cells of the yellowtail *Seriola quinqueradiata*, following exposure to the red tide species *Chattonella antiqua* 101

Volume 88 Number 2 1985

R. N. Gibson, I. A. Ezzi
Effect of particle concentration on filter- and particulate-feeding in the herring *Clupea harengus* 109

J. M. Al-Hassan, M. Thomson, K. R. Criddle, B. Summers, R. S. Criddle
Catfish epidermal secretions in response to threat or injury: a novel defense response 117

D. S. McKelvie
Discreteness of pelagic faunal regions 125

D. J. Laurén, S. Rice
Significance of active and passive depuration in the clearance of naphthalene from the tissues of *Hemigrapsus nudus* (Crustacea: Decapoda) 135

K. R. Carman, D. Thistle
Microbial food partitioning by three species of benthic copepods 143

T. A. Probyn, C. D. McQuaid
In-situ measurements of nitrogenous nutrient uptake by kelp (*Ecklonia maxima*) and phytoplankton in a nitrate-rich upwelling environment 149

J. Costelloe
The annual reproductive cycle of the holothurian *Aslia lefevrei* (Dendrochirota: Echinodermata) 155

P. L. Jokiel, R. Y. Ito, P. M. Liu
Night irradiance and synchronization of lunar release of planula larvae in the reef coral *Pocillopora damicornis* 167

continued on next page

H. Fricke, D. Meischner
Depth limits of Bermudan scleractinian corals: a submersible survey 175

R. B. Rivkin, E. Swift
Phosphorus metabolism of oceanic dinoflagellates: phosphate uptake, chemical composition and growth of *Pyrocystis noctiluca* 189

H. M. Edenborn, C. D. Litchfield
Glycolate metabolism by *Pseudomonas* sp., strain S227, isolated from a coastal marine sediment 199

E. L. Rice, T. J. Kenchington, A. R. O. Chapman
Intraspecific geographic-morphological variation patterns in *Fucus distichus* and *F. evanescens* 207

Corrigendum 216

Volume 88 Number 3 1985

C. C. Wallace
Reproduction, recruitment and fragmentation in nine sympatric species of the coral genus *Acropora* 217

P. J. W. Olive, M. G. Bentley, N. H. Wright, P. J. Morgan
Reproductive energetics, endocrinology and population dynamics of *Nephtys caeca* and *N. hombergi* 235

A. Clarke, A. Skadsheim, L. J. Holmes
Lipid biochemistry and reproductive biology in two species of Gammaridae (Crustacea: Amphipoda) 247

W. J. Diehl, R. K. Koehn
Multiple-locus heterozygosity, mortality, and growth in a cohort of *Mytilus edulis* 265

A. Fleminger
Dimorphism and possible sex change in copepods of the family Calanidae 273

M. Yokote, T. Honjo, M. Asakawa
Histochemical demonstration of a glycocalyx on the cell surface of *Heterosigma akashiwo* 295

L. Legendre, S. Demers, J.-C. Therriault, C.-A. Boudreau
Tidal variations in the photosynthesis of estuarine phytoplankton isolated in a tank 301

T. F. Hourigan, C. D. Kelley
Histology of the gonads and observations on the social behavior of the Caribbean angelfish *Holacanthus tricolor* 311

Indexed in Current Contents